Technical Management Team
2007 Year End Review

Water Quality

Fixed Monitoring Stations

- Corps operated a total of 28 FMS's
  - Portland District: 8 Stations
  - Walla Walla District: 15 Stations
  - Seattle District: 5 Stations
- Bureau of Reclamation Operated 4 FMS's
- Mid-C PUD's Operated 10 FMS's
- Data can be obtained at "Dataquery"
  - http://www.nwd-wc.usace.army.mil/perl/dataquery.pl

Snake River Spill Operations

Project	Spring (April 3 – June 20)	Summer (June 21 – August 31)
Lower Granite	20 kcfs (RSW with training spill)	18 kcfs (RSW with training spill)
Little Goose	To the spill cap up to 30% of project outflow.	
Lower Monumental	To the spill cap (~27 kcfs).	To the spill cap up to 17 kcfs.
Ice Harbor	Daytime (0500-1800): 45 kcfs Nighttime (1800-0500): To the spill cap. (From April 30 – July 22, Alternate between 30% of outflow 24 hrs per day and 45 kcfs Daytime/To the spill cap at night)	

Columbia River Spill Operations

Project	Spring (April 10 – June 21)	Summer (July 1 – August 31)
McNary	40% of outflow, 24 hrs per day.	June 22 – August 31 Alternate between 40% and 60% of outflow (up to the spill cap), 24 hrs per day.
John Day	0 kcfs daytime (0600-1800)/To the spill cap up to 60% of outflow at night.	To the spill cap up to 30% of outflow, 24 hrs per day.
The Dalles	To the spill cap up to 40% of outflow, 24 hrs per day.	
Bonneville	To the spill cap up to 100 kcfs.	21 June – 15 July: 85 kcfs daytime/spill cap at night. 16 July – 31 August: 75 kcfs daytime/spill cap at night.

Total Dissolved Gas

Comparison of Exceedences with Previous Years

TDG Exceedences from High 12-hr Average in 24 hours

Year	Gauge-Days in Spill Season[H]	Gauge-Days of Voluntary Spill in Spill Season	Number of Days Exceeded	Percent of Days Exceeding TDG Standard	
				All Spill	Volunt. Spill
2007	2504 '	2504 '	99	4.0%	4.0%
2006	2504 '	2504 '	581	23.2%	23.2%
2005	2639	2124	69	2.6%	3.2%
2004	2639	1591	71	2.7%	4.5%
2003	2639	1936	243	9.2%	12.6%
2002	2639	2039	490	18.6%	24.0%
2001	2639	398	13	0.5%	3.3%
Ave.	**--**	**--**	**245**	**9.5%**	**8.2**

[H] Spill Season begins on April 3rd and ends on August 31st.

' Based on 17 TDG gauges (removed MCN Forebay (Oregon Side) in 2006). All other years based on 18 TDG gauges.

Total Dissolved Gas

AVERAGE HIGH 12 HR %TDG EXCEEDANCES AT FMS FROM 1999 - 2007										
	2007	2006	2005	2004	2003	2002	2001	2000	1999	Totals
Water Quality Gages	**Qty.**	**Qty.**	**Qty.**	**Qty.**	**Qty.**	**Qty.**	**Qty.**	**Qty.**	**Qty.**	**Qty.**
Lower Granite Forebay	0	0	0	0	0	0	5	2	0	7
Lower Granite Tailwater	0	28	0	0	15	17	0	4	15	79
Little Goose Forebay	0	24	0	3	10	17	0	2	39	95
Little Goose Tailwater	0	19	0	0	6	6	0	9	6	46
Lower Monumental Forebay	11	56	6	1	19	49	0	28	44	214
Lower Monumental Tailwater	7	29	7	1	10	6	0	12	26	98
Ice Harbor Forebay	31	51	3	4	35	24	0	34	44	226
Ice Harbor Tailwater	0	22	3	2	4	6	0	4	12	53
McNary Forebay - Wa.	6	31	8	10	24	43	1	14	22	159
McNary Forebay - Or.	--	--	11	23	32	45	5	22	19	157
McNary Tailwater	1	32	1	7	12	31	0	17	50	151
John Day Forebay	0	20	2	0	10	11	0	1	8	52
John Day Tailwater	3	38	3	0	0	29	0	12	43	128
The Dalles Forebay	8	40	6	5	11	18	0	5	1	94
The Dalles Tailwater	0	10	0	0	4	11	0	5	5	35
Bonneville Forebay	3	51	3	1	17	30	0	14	19	138
Cascade Island	0	61	0	---	---	---	---	---	---	61
Warrendale	--	--	---	0	1	19	0	6	2	28
Camas/Washougal	29	63	16	14	33	65	2	58	51	331
Total Number of Exceedances	**99**	**575**	**69**	**71**	**243**	**427**	**13**	**249**	**406**	**2152**

Total Dissolved Gas

TDG EXCEEDANCE TRACKING
Types of Exceedances:
1. Exceedance due to high runoff flows and flood control efforts.
2. Exceedance due to Intertie line outages.
3. Exceedance due to unit outages during repair or maintenance.
4. Exceedance due to BPA inability to handle load so water was spilled.
5. Exceedance due to a break down in communication. Teletype went out but no change occurred or Project operator interpreted teletype differently than what was intended.
6. Exceedance due to uncertainties when using best professional judgment to apply the spill guidance criteria, e.g., travel time, degassing, water temperature effects, spill patterns.
7. Exceedance due to high TDG levels coming from the Mid Columbia River Dam (see Pasco FMS readings).
8. Exceedance due to high TDG levels coming from the Snake River projects (see Ice Harbor Dam FMS readings).
9. Exceedance due to a load rejection; the powerhouse was not working and the river was spilled.
10. Exceedance due to lack of information; the FMS gage malfunctioned and we had no information at the time of making spill change decisions.
11. Exceedance due to mechanical problems, e.g., gate was stuck open, passing debris.
12. Exceedance due to sharp rise in water temperature (a 3 degree F. or greater change in a day).
13. Exceedance due to bulk spill pattern being used which generated more TDG than expected.
14. Exceedance due to non-functioning of flow deflectors during tailwater elevation above 19 ft and especially above 26 ft.

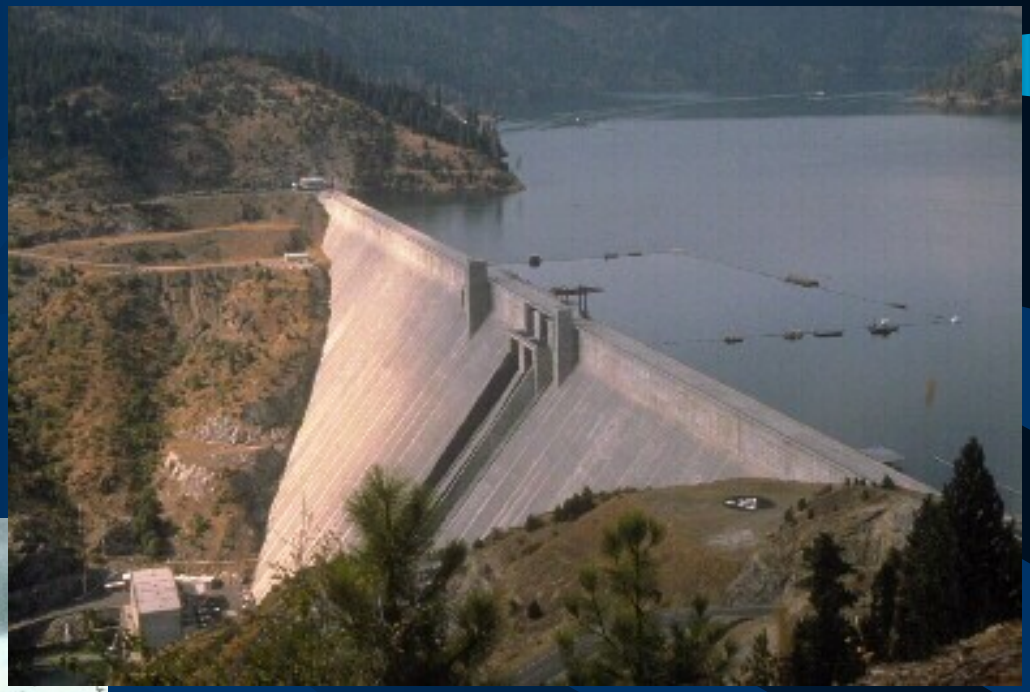
Total Dissolved Gas

Snake River TDG Exceedance Types Totals									
TDG Exceedance Types	Lower Granite Forbay	Lower Granite Tailwater	Little Goose Forbay	Little Goose Tailwater	Low Monumental forebay	Low Monumental Tailwater	Ice Harbor Forbay	Ice Harbor Tailwater	Totals
1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0
6	0	0	0	0	11	7	31	0	49
7	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	11	7	31	0	49

Total Dissolved Gas

Columbia River TDG Exceedance Types Totals										
TDG Exceedance Types	McNary Forbay	McNary Tailwater	John Day Forbay	John Day Tailwater	The Dalles Forbay	The Dalles Tailwater	BON Forbay	BON Tailwater	Camas/ Washougal Forbay	Totals
1	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0
3	0	1	0	0	0	0	0	0	0	1
4	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0
6	1	0	0	3	8	0	3	0	29	44
7	5	0	0	0	0	0	0	0	0	5
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0
Grand Total	6	1	0	3	8	0	3	0	29	50

Dworshak Summer Operations



Dworshak Dam

Lower Granite Dam Tailwater

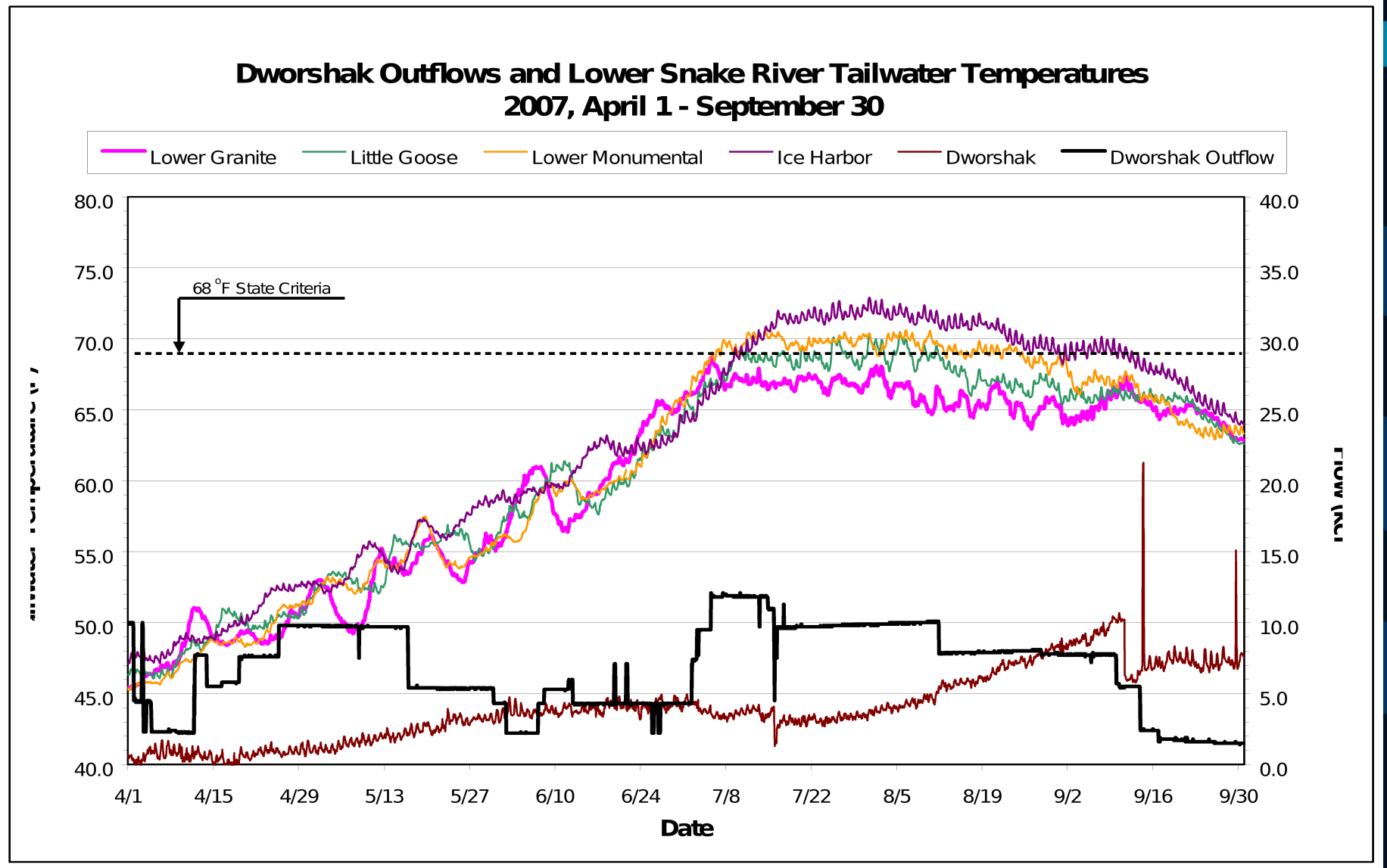
Dworshak Summer Operations

Table I-1: Dworshak Flow Augmentation/Temperature Control Operations in 2007.

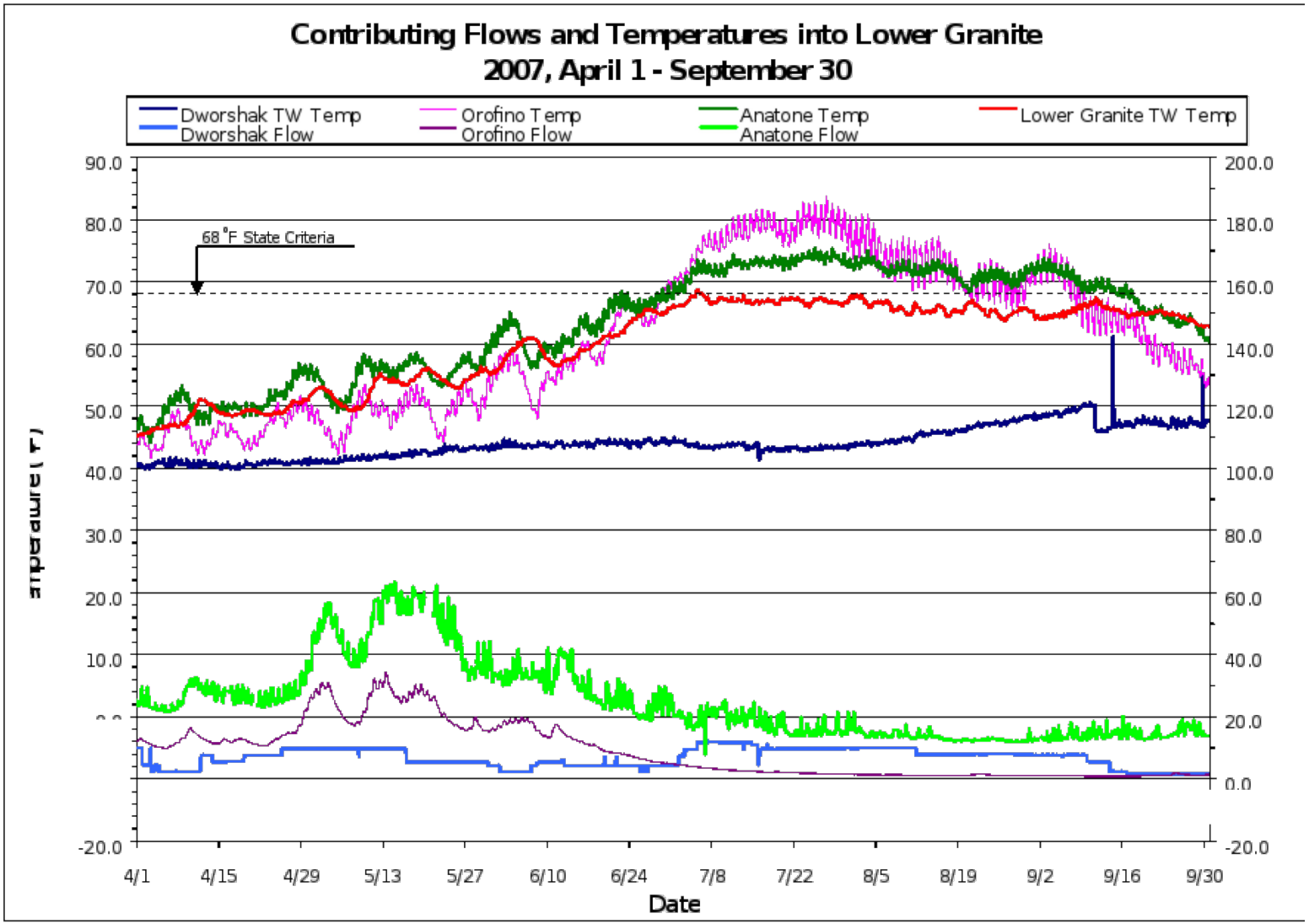
Operation Start		Operation End		Outflow (kcfs)	Ouflow Target Temperature (°F)	Selector Gate Position		
Date	Time (hrs)	Date	Time (hrs)			Small Unit	Small Unit	Big Unit
2 July	1000	3 July	0600	7.4 – 7.6	44.0 – 45.0	O		O
3 July	0600	3 July	1200	9.4 – 9.5	43.0	O	O	O
3 July	1300	5 July	1400	9.5	43.0	O	U	O
5 July	1400	13 July	1200	11.8 – 12.1	43.0	O	U	O
13 July	1300	14 July	2200	11.8 – 12.1	43.0	U	U	O
14 July	2200	15 July	2200	10.9 – 11.0	43.0	U	U	O
15 July	2300	16 July	0800	9.6	43.0	U	U	U
16 July	0900	11 Aug	2200	9.6 – 10.1	43.0	U	O	U
11 Aug	2300	9 Sep	2300	7.7 – 8.1	45.0 – 46.0		O	U
9 Sep	2400	11 Sep	0930	5.4 – 5.7	49.0 – 50.0		O	U
11 Sep	0930	13 Sep	2200	5.4 – 5.7	45.0 – 47.0			U
13 Sep	2300	16 Sep	2200	2.4 – 2.5	Lowest Possible	U		
16 Sep	2200	End of Season		1.6 – 1.8	Lowest Possible	U		

U = Undershot, O = Overshot.

Dworshak Summer Operations



Dworshak Summer Operations



Dworshak Summer Operations

Table I-4

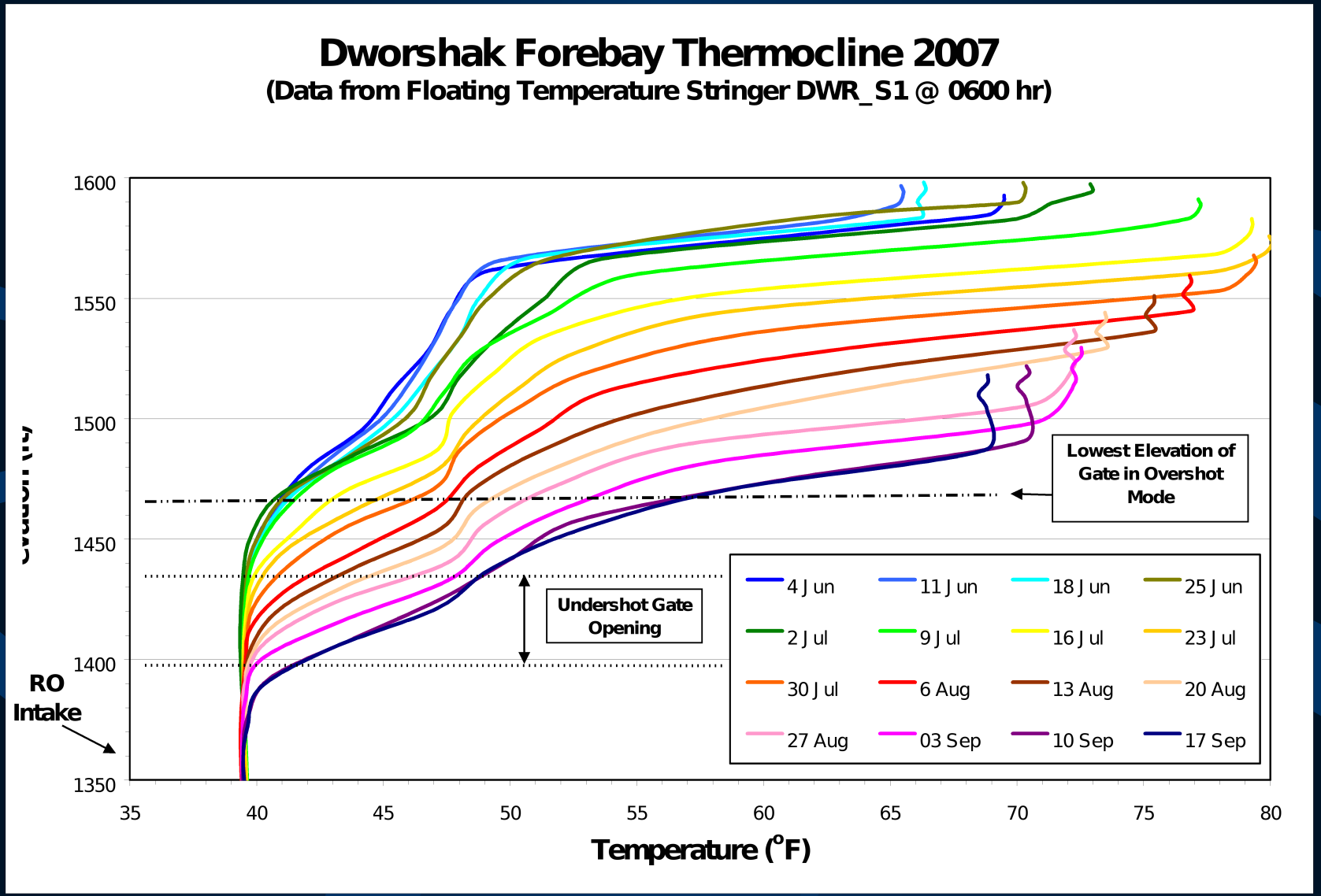
Lower Granite Tailwater State Temperature Criteria Exceedance Comparison
2007, April 1 - September 30 (Temperature in Degrees Fahrenheit)

Annual Statistics		
Year	Hours of Exceedance	Index of Exceedance
2007	31	8
2006	223	131
2005	0	0
2004	7	2
2003	63	14
2002	17	4
2001	193	125
2000	0	0
1999	23	6
1998	1184	2125
1997	137	56
1996	526	613
1995	686	399

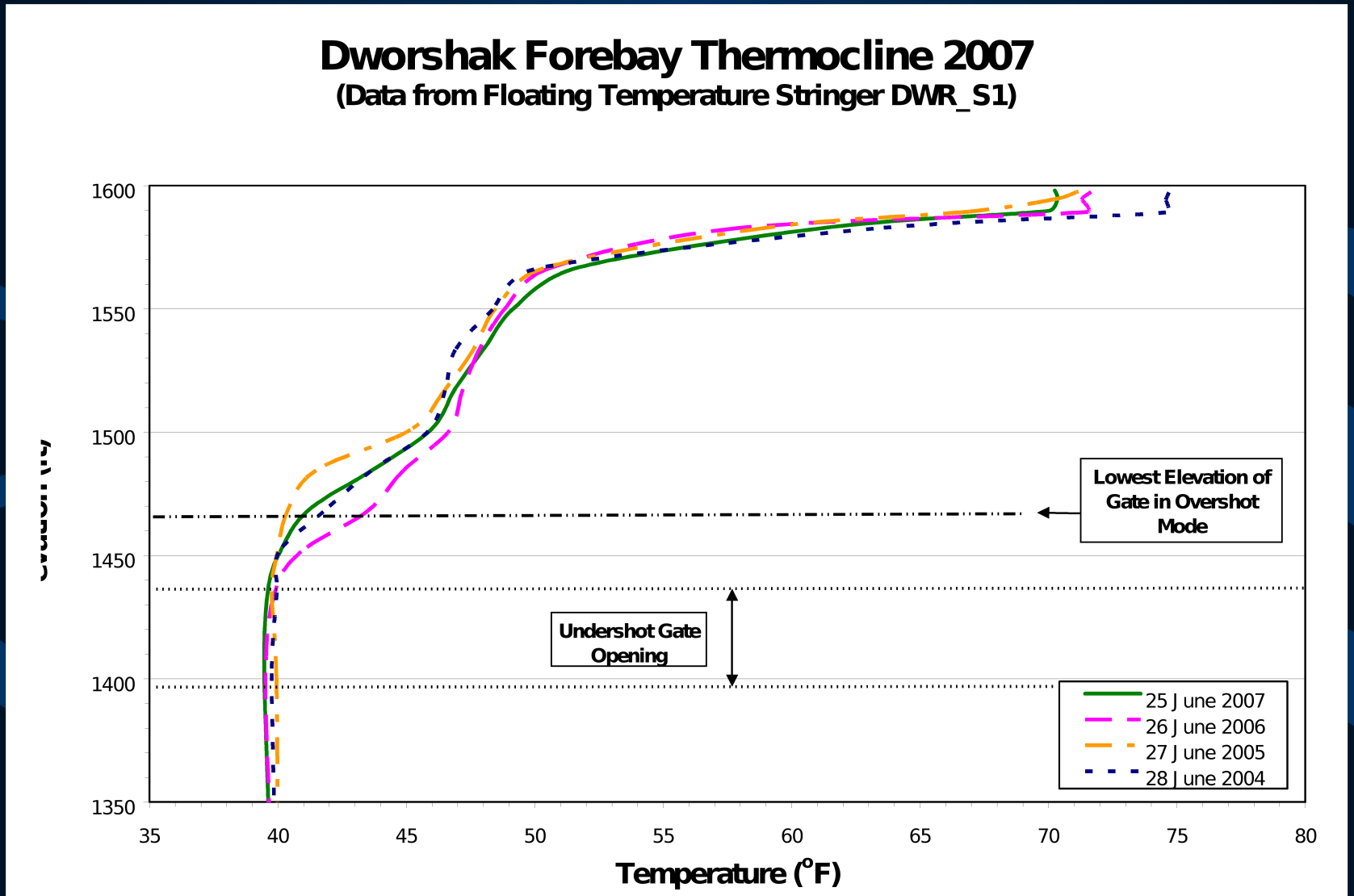
13-yr Statistics			
Hours of Exceedance		Index of Exceedance	
Range:		**Range:**	
High: 1184 hrs (1998)		High: 2,125 degree-hrs (1998)	
Low: 0 hrs (2000, 2005)		Low: 0 degree-hrs (2000, 2005)	
Overall Average:	238 hrs	**Overall Average:**	268 degree-hrs
Average 1995-1999:	511 hrs	**Average 1995-1999:**	640 degree-hrs
Average 2000-2007:	67 hrs	**Average 2000-2007:**	35 degree-hrs

Note: The Lower Granite tailwater gauge went down on 9/1/97 at 1600 hrs and did not report any further data for the rest of the year. The last temperature recorded was 69.1 F. Therefore, the 1997 Exceedance Index value should be slightly higher. During the years 1996 and 1995 the gauges went down for the season on 9/17 and 9/25, respectively, and during 1998 there was 56 hours of data missing from 9/22 - 9/24.

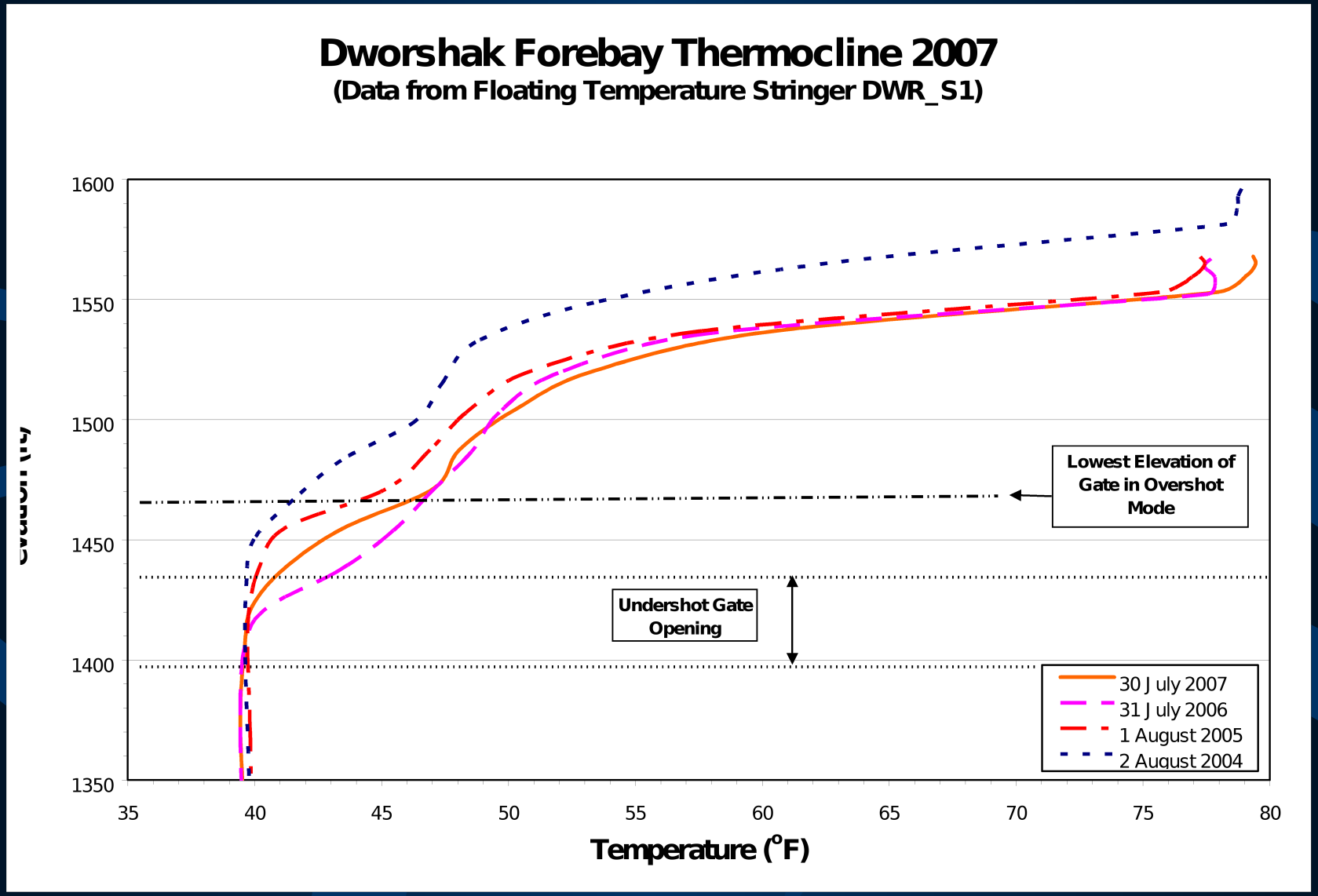
Dworshak Summer Operations



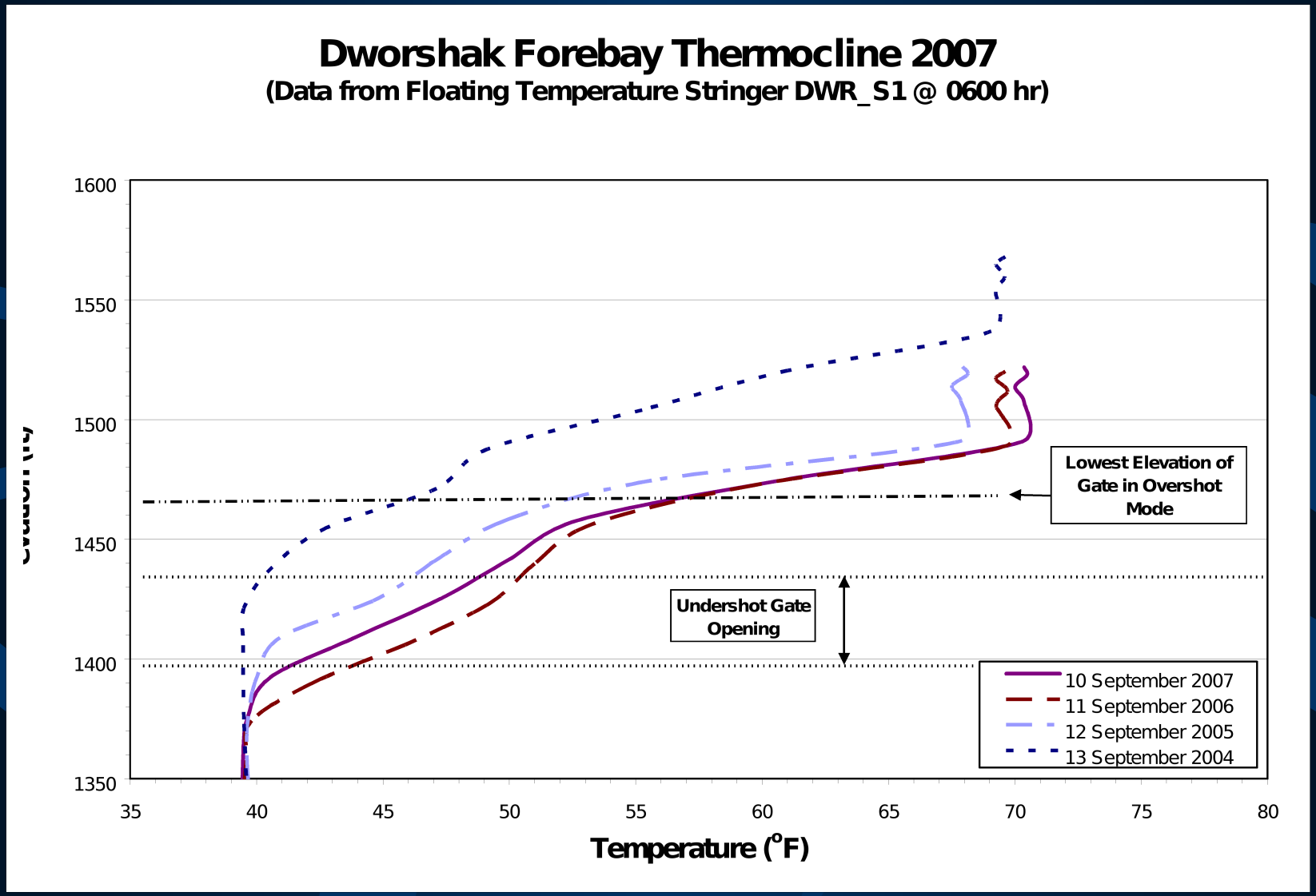
Dworshak Summer Operations



Dworshak Summer Operations



Dworshak Summer Operations



Technical Management Team
2007 Year End Review

Water Quality